

## MARSH LAKE



### Introduction

Marsh Lake is in a glacial valley on the north slope of the Uinta Mountains. It is a natural impoundment, formed by a dam of lateral moraine–glacial rubble. (The China Lake report has a complete description of the process of glaciation.) Marsh Lake is a small lake in the Smiths Fork valley, four miles from the Wyoming state line. It is in a

cluster of four lakes and reservoirs, also including Stateline Reservoir, Bridger Lake, and China Lake. The

### Characteristics and Morphometry

Lake elevation (meters / feet)	2,845 / 9,335
Surface area (hectares / acres)	15.38 / 38
Watershed area (hectares / acres)	67 / 166
Volume (m <sup>3</sup> / acre-feet)	
capacity	246,700 / 200
conservation pool	
Annual inflow (m <sup>3</sup> / acre-feet)	
Retention time (years)	
Drawdown (m <sup>3</sup> / acre-feet)	82,600 / 67
Depth (meters / feet)	
maximum	10.67 / 35
mean	4.57 / 15
Length (meters / feet)	975 / 3,200
Width (meters / feet)	183 / 600
Shoreline (km / miles)	2.13 / 1.3

### Location

County	Summit
Longitude / Latitude	110 23 42 / 40 57 29
USGS Map	Bridger Lake, UT / WY 1967
DeLorme's Utah Atlas and Gazetteer™	Page 55, A-5
Cataloging Unit	Black's Fork (1404017)

reservoir shoreline is 100% publicly owned by the Wasatch-Cache National Forest. Public access is unrestricted. The passage of water through the lake is unregulated by man.

### Recreation

Bridger Lake in the Smiths Fork drainage, 30 miles east of U-150 on the North Slope Road (FS-058). It is also accessible from Mountain View, Wyoming. Go south from Mountain View on the paved road towards Robertson (not towards Lonetree). At the second 90° bend to the west (about 5 miles from Mountain View), leave the

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highway, continuing south on a gravel road that becomes

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FS-072.

FS-072 and FS-058 join at China Meadows Campground. Marsh Lake is 2 miles north of the campground on FS-072 (and 4 miles south of the Wyoming State Line). The route to the China Meadows is well marked.

The lake offers fishing, boating and some degree of solitude. The water is too cold for most swimmers. Fishing is popular, and small boats can be carried in from the road.



Marsh Lake Campground, administered by the Forest Service, has 32 campsites, drinking water, and primitive latrines. There are several other USFS campgrounds in the vicinity, including Stateline, Trail Head, Bridger Lake, China Meadows, and Smiths Fork Trail Head. This area is a popular access to the High Uinta Wilderness, so campgrounds are heavily used in the summer.

### Watershed Description

It might seem odd that the watershed area is so small in comparison to the lake. This is because the lake is the result of variations in the amount of rubble that different parts of the glacier carried. A natural dam was deposited and a lake formed when the glaciers retreated. The basin has probably never been dry, and the retention time is fairly long.

Marsh Lake is in the middle of the valley floor. The valley is about two miles wide and 800' deep. The lake's watershed itself is a tiny, relatively flat portion of the valley floor. There are no perennial inflows.

The watershed high point, the lateral moraine 300m east of the lake, is 2,886 m (9,470 feet) above sea level, thereby developing a complex slope of 3.1% to the reservoir. The outflow joins the outflow from Bridger Lake and joins the East Fork Smiths Fork at Stateline Reservoir (an impoundment of Smiths Fork).

The soil in the watershed is derived from glacial till, and alluvium. It is comprised primarily of debris from the

scouring upstream valleys. The till and alluvium is chemically similar to the Precambrian rocks of the High Uintas. See Appendix III for a complete soil description.

The vegetation community is comprised of lodgepole pine and marshlands. The watershed receives 51 - 64cm (20 - 25 inches) of precipitation annually with a frost-free season of 20 - 40 days.

Land use is 100% multiple use. The major use of the watershed is sheep grazing and recreation.

### Limnological Assessment

The water quality of Marsh Lake is very good. It is considered to be moderately hard with a hardness concentration value of approximately 120 mg/L (CaCO<sub>3</sub>). The only parameter that has exceeded State water quality standards for defined beneficial in recent years is dissolved oxygen. Marsh lake is an isolated body of water without a perennial inflow or out flow of water. Historically this lake due to a lack of circulation and exchange of water has stratified in early summer and produced winter fish kills due to anoxic conditions. Although the Lake is

#### Limnological Data

Data sampled from STORET site: 593940

<b>Surface Data</b>	<b>1981</b>	<b>1989</b>	<b>1991</b>
Trophic Status	E	O	O
Chlorophyll TSI	-	32.58	37.40
Secchi Depth TSI	-	32.48	38.33
Phosphorous TSI	53.2	17.35	27.35
Average TSI	53.2	28.14	34.36
Chlorophyll <i>a</i> (ug/L)	-	1.5	2
Transparency (m)	-	7	4.5
Total Phosphorous (ug/L)	30	3	5
pH	8.0	8.2	7.9
Total Susp. Solids (mg/L)	<5	-	<3
Total Volatile Solids (mg/L)	-	-	3.5
Total Residual Solids (mg/L)	-	-	1
Temperature (°C / °f)	18/64	14/57	15/59
Conductivity (umhos.cm)	239	224	204
<b>Water Column Data</b>			
Ammonia (mg/L)	0.3	0.03	0.03
Nitrate/Nitrite (mg/L)	0.48	-	0.01
Hardness (mg/L)	128	-	112
Alkalinity (mg/L)	124	-	109
Silica (mg/L)	-	-	7.2
Total Phosphorous (ug/L)	30	8	7
<b>Miscellaneous Data</b>			
Limiting Nutrient	P	N	N
DO (Mg/l) at 75% depth	4.4	5	2.1
Stratification (m)	2-8	NO	6-8
Depth at Deepest Site (m)	8	10.1	10.1

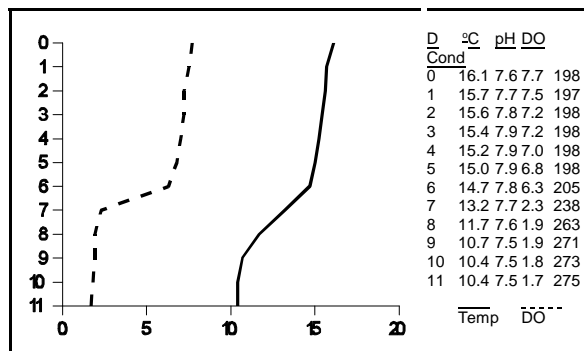
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oligotrophic with low algal production, anoxic conditions develop which are detrimental to the overwintering of fish. The lake is approximately 10 meters in depth but light penetration occurs to the bottom of the reservoir due to its high clarity. As a result extensive beds of macrophytes develop in the sediments of the lake. The decomposition of these plants and other organic materials provide for extensive oxygen depletion during the winter. This leads to the development of anoxic conditions and fish kills. It is also in an area that has a prolonged and severe winter causing persistent ice coverage. Dissolved oxygen depletions were evident in the September 4, 1991 profile. Below the thermocline concentrations quickly drop to 1.7 mg/L near the bottom. A review of a profile obtained on April 10, 1990 shows a concentration of 3.0 mg/L at 1 meter and virtually 1.2 mg/L from 2 to 10.5 meters. In an effort to offset the high oxygen demand during the winter the USFS had installed a circulator. They have only achieved marginal success due to vandalism and problems associated with it. Even though the lake still winter kills most winters, it has very productive water during the summer.

Although in 1981 the reservoir was characterized as a phosphorus limited system, the 1989-91 data suggest that the reservoir is currently a nitrogen limited system. TSI values indicate the reservoir is oligotrophic in recent years.

According to DWR fish kills occur annually with a total loss evident most years. The DWR typically stocks the reservoir annually with 4,000 catchable rainbow trout (*Oncorhynchus mykiss*), and 1,500 catchable albino rainbow trout (*Oncorhynchus mykiss*).

The lake was treated for rough fish competition in 1954, so populations of native fishes may not be present in the lake as indicated when DWR staff found brook trout (*Salvelinus fontinalis*) in 1980. Marsh Lake is maintained for recreation and fishery purposes. This popularity is due in part to its easy access and close proximity to the High Uintas Primitive Area.



Phytoplankton in the euphotic zone include the following taxa (in order of dominance)

Species	Cell Volume (mm <sup>3</sup> /liter)	% Density By Volume
<i>Sphaerocystis schroeteri</i>	18.487	98.91
<i>Melosira granulata</i>	0.054	0.29
Centric diatoms	0.050	0.27
<i>Oocystis</i> sp.	0.041	0.22
<i>Euglena</i> sp.	0.040	0.22
Pennate diatoms	0.016	0.09
Total	18.688	
Shannon-Weaver [H']	0.08	
Species Evenness	0.04	
Species Richness	0.26	

### Information

#### Management Agencies

Wasatch-Cache National Forest	524-5030
Mountain View Ranger District	307-782-6555
Mountainlands Association of Govs	377-2262 / 534-0772
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146

#### Recreation

Mountainland Travel Region (Provo)	377-2262
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#### Reservoir Administrators

Division of Wildlife Resources	538-4700
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The phytoplankton community is dominated by the presence of green algae which is indicative of its trophic status and its good water quality.

### Pollution Assessment

Nonpoint pollution sources include sedimentation and nutrient loading from grazing, and wastes or litter from recreation. Cattle graze in the watershed and around the reservoir.

There are no point pollution sources in the watershed.

### Beneficial Use Classification

The state beneficial use classifications include: boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).

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